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Promotion of new and renewable sources of energy, including the implementation of the World Solar Programme 1996-2005

Report of the Secretary-General

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I. Introduction

1. The General Assembly, in its resolution 53/7, endorsed the World Solar Programme 1996-2005 as a contribution to the overall sustainable development agenda; in its resolution 54/215, the Assembly called for further action to ensure that the Programme was fully integrated into and brought into the mainstream of the efforts of the United Nations system towards attaining the objective of sustainable development. The Assembly also emphasized that the achievement of more substantive results in the implementation of the World Solar Programme 1996-2005, as part of the promotion of new and renewable sources of energy, would require the more active and collaborative involvement of all concerned parties, including Governments, multilateral funding agencies and relevant parts of the United Nations system.

2. Taking note with appreciation of the report of the Secretary-General on the World Solar Programme 1996-2005 (A/54/212), including measures taken by the various entities of the United Nations system for the implementation of the Programme, the General Assembly called upon all relevant funding institutions and bilateral and multilateral donors, as well as regional funding institutions and non-governmental organizations, to support, as appropriate, the efforts being made for the development of the renewable energy sector in developing countries on the basis of environment-friendly, renewable sources of energy of demonstrated viability, and invited all Governments to encourage the involvement of all relevant stakeholders, including the private sector, in the promotion of research on and the development of renewable sources of energy, in particular in the implementation of the World Solar Programme 1996-2005, in accordance with their respective national policies. The Assembly requested the Secretary-General, in consultation with the United Nations Educational, Scientific and Cultural Organization (UNESCO) and in cooperation with the United Nations Environment Programme (UNEP) and other relevant organizations, to submit to it, at its fifty-fifth session, a report on the concrete action being taken for the effective implementation of the World Solar Programme 1996-2005, including promotion for the mobilization of resources. The present report has been prepared pursuant to that request.

II. Background

3. Over the past few decades, scientists and environmentalists have improved their understanding of the environmental impacts of the extraction and utilization of conventional and nuclear energy resources. It is now clear that environmental impacts of releases into the atmosphere of anthropogenic pollutants, greenhouse gases and radioactive gases and dust extend beyond national boundaries. The consequences of degraded urban air quality, acid precipitation and global warming make clear that the extraction and utilization of these resources can negatively impact the ecosystems of the Earth. For example, the rate of carbon dioxide emission into the atmosphere exceeds the rate at which the oceans and vegetation remove it. This unsustainable situation cannot continue indefinitely without the occurrence of natural adjustments that are expected to result in negative economic and social impacts. Therefore, it is clear that the need to mitigate and, where possible, prevent these impacts will increasingly influence the evolution of the global economy.

4. It is widely reported that some 2 billion people have no access to commercial energy. This means that nearly 35 per cent of the world's population has inadequate energy for cooking, lighting, heating and/or air conditioning of their homes, clinics, schools and community centres, a situation that acts as a significant brake on the development process. Renewable energy programmes, including the World Solar Programme, can provide solutions to the energy problems of rural areas, as well as contribute to solving those of the urban poor, and thereby improve the quality of life in such areas.

5. Growing environmental and social concerns, both on the part of decision makers and the general public, have brought a new dimension to the perception of renewable energy as being capable of altering the energy mix significantly in the long run in favour of sustainable energy. The World Solar Programme 1996-2005 is an instrument at the service of the international community for the promotion and enhanced utilization of environment-friendly, renewable sources of energy.[1]

III. Relationship to the Programme for the Further Implementation of Agenda 21

6. The General Assembly, in the Programme for the Further Implementation of Agenda 21, decided that energy issues should be addressed at the ninth session of the Commission on Sustainable Development, to be held in 2001 (see Assembly resolution S-19/2, annex, para. 46 (a) and appendix). Within the framework of the preparatory process for that session, the first session of the Ad Hoc Open-ended Intergovernmental Group of Experts on Energy and Sustainable Development was held in New York from 6 to 10 March 2000. The Co-Chairperson's summary of the discussion, contained in the report on the session (E/CN.17/2000/12) indicates that the preparations for the ninth session of the Commission should build on Agenda 21, taking into account the principle of common but differentiated responsibilities, and that it could also take into account the Programme of Action for the Sustainable Development of Small Island Developing States,[2] the outcome of the twenty-second special session of the General Assembly, the World Solar Programme 1996-2005 and other existing international documents that address energy issues. Moreover, renewable energy was one of the key issues identified in the report of the Secretary-General to the Group of Experts (E/CN.17/ESD/2000/3) and endorsed by that body as contained in the report on its first session.

7. The Committee on Energy and Natural Resources for Development, which was originally scheduled to meet in 2001, has advanced its second session to August 2000 in order to provide timely input into the preparatory process for the ninth session of the Commission. On the agenda of its second session, the Committee has an item on renewable energy, with special emphasis on solar energy, for which there will be a report of the Secretary-General. The report will focus on the current status of solar energy utilization worldwide, the constraints and barriers to, and the policies and actions that will accelerate, its utilization on a wider scale, and increasing financial investment in support of those actions.

IV. International coordination and cooperation

8. At its thirtieth session, held from 26 October to 17 November 1999, the General Conference of UNESCO adopted a resolution on the World Solar Programme 1996-2005 (30C/resolution 19),[3] authorizing the Director-General of UNESCO to, *inter alia*, undertake concrete action on the basis of United Nations General Assembly resolution 53/7. The World Solar Commission and its General Secretariat (located in the Division of Engineering and Technology of UNESCO) continues to guide and coordinate the implementation of a number of projects included in the World Solar Programme 1996-2005. Since the fifty-third session of the General Assembly, closer cooperation between the involved entities of the United Nations system has been achieved through the Ad Hoc Inter-agency Task Force on Energy. Moreover, the first session of the Committee on Energy and Natural Resources for Development, held in New York from 5 to 16 April 1999, noted the valuable recommendations for accelerating the development and deployment of renewable energy technologies contained in the World Solar Programme 1996-2005.

9. During 1999, UNESCO initiated the preparation of a global renewable energy education and training programme, as one of the five major projects of universal scope included in the World Solar Programme 1996-2005. In view of the priority needs of African countries as regards capacity-building in the area of renewable energy applications, the African chapter of the project was completed first, at the end of 1999. The education and training programmes were noted with appreciation by the General Assembly at its fifty-fourth session (resolution 54/215) and by the General Conference of UNESCO at its thirtieth session (30C/resolution 19).

10. Efforts continue to be made within the United Nations system to promote policies and programmes for the development and utilization of renewable energy resources and to foster cooperation in the implementation of international, regional and national projects, in accordance with General Assembly resolutions 53/7 and 54/215, in pursuance of the implementation of Agenda 21 and, thereby, towards attaining the objectives of sustainable development.

11. In response to the demands of Member States and in line with their priorities, the entities of the United

Nations system are involved in a broad range of technical cooperation activities. Prominent among these activities are those intended to promote the widespread development and application of renewable energy technologies, particularly to improve access to modern energy services by rural populations, and including capacity-building and institutional development, to achieve the economic, social and environmental objectives of sustainable development.

12. The Department of Economic and Social Affairs of the United Nations Secretariat, which has had a renewable energy programme for nearly three decades, is undertaking a number of initiatives with regard to the development and utilization of these resources. With funds from the Global Environment Facility (GEF) and from the Governments of Austria, China and the Netherlands, the Department is implementing a large five-year project in China to remove barriers to the rapid commercialization of renewable energy and to demonstrate some key applications. In the Arab States, a regional project funded by the United Nations Development Programme (UNDP) is being implemented to build institutional capacities for renewable energy development, including entrepreneur development, standards and best practices. The project is building capacities and strengthening the enabling environment for the dissemination of renewable energy applications to address rural development. With financing from a trust fund established by the Government of Italy, the Department is assisting small island developing States with several concrete projects involving renewable energy applications such as solar lighting for homes, schools and community centres, and solar-operated radio, television and medicine refrigerators. Projects have recently been completed in Saint Lucia and Solomon Islands, and others are under implementation in Fiji, the Marshall Islands, Mauritius, the Federated States of Micronesia and Papua New Guinea. These projects bring tangible benefits of sustainable development to people in remote locations in small island developing States. At the invitation of the Government of the Syrian Arab Republic, the Department is undertaking a UNDP-funded project to develop a master plan for the development and application of renewable energy in that country.

13. The regional commissions, in particular the Economic Commission for Latin America and the Caribbean (ECLAC), the Economic and Social Commission for Asia and the Pacific (ESCAP) and the Economic and Social Commission for Western Asia, are implementing extensive programmes that promote the use of renewable sources of energy. In addition, ESCAP is undertaking a technical assistance project to promote the commercialization of renewable energy technologies in the Asian region.

14. In response to requests from its member countries to assist them in the further implementation of Agenda 21, the Food and Agriculture Organization of the United Nations (FAO) provides technical assistance to meet their energy requirements in agriculture, forestry and fisheries as a means of achieving sustainable development. Moreover, FAO provides assistance in strengthening their institutional and human capacities to implement rural energy and bioenergy programmes within the framework of the Kyoto Protocol to the United Nations Framework Convention on Climate Change. Within the context of an integrated approach for the assessment, planning and implementation of programmes for energy and rural development, renewable energy applications, such as photovoltaic systems, are promoted especially in relation to enhanced agricultural productivity and other income-generating activities. In placing special emphasis on bioenergy as a key component in the present energy scenario in rural areas and with a potential major role as a modern energy carrier, FAO assembles and provides wood energy data and projections and implements many technical assistance projects aimed at increasing the supply of biofuel, reducing fuelwood consumption through conservation and efficiency improvements, promoting renewable energy applications and promoting bioenergy for combined heat and power.

15. Among the energy-related projects funded by GEF, through its three implementing agencies (UNDP, UNEP and the World Bank), there are a large and increasing number devoted to promoting renewable energy technologies by reducing barriers, implementation costs and long-term technology costs.

16. UNDP, for its part, has continued its efforts in promoting renewable energy through many of the activities of the UNDP Initiative for Sustainable Energy, which focuses on using energy as one of the means to achieving the goal of sustainable human development. The Sustainable Energy Global Programme focuses on support for energy programme development, the mobilization of funds and strategic initiatives. The *World Energy Assessment*, jointly

established by UNDP, the Department of Economic and Social Affairs and the World Energy Council, is one of the key energy policy and strategic initiatives in preparation for the ninth session of the Commission on Sustainable Development. The chapter of the *World Energy Assessment* devoted to renewable energy concludes that, despite a number of factors that will have to be overcome in order to increase the market deployment of renewable energy technologies, transition to a renewables-based energy system would have to rely largely on (a) the successful internalization of the environmental costs and other externalities and the adoption of appropriate pricing policies for fossil fuels, and (b) the continued development and diffusion of renewable energy technologies that become increasingly competitive through cost reductions resulting from technological and organizational development.

17. The energy programme of UNEP broadly supports the objectives of the World Solar Programme, particularly those with an environmental link. Among its energy activities, UNEP, in promoting commercial financing of renewable energy investments with funding provided by GEF, has recently started a programme to help establish small, private sector energy companies in Africa that are based on renewable energy technologies. It has also prepared with the UNEP Collaborating Centre on Energy and Environment, a book on *Wind Energy in the 21st Century: Economics, Policy, Technology and the Changing Electricity Industry*, and is preparing a global study on the potential for adding photovoltaic systems to existing hydropower facilities. Moreover, UNEP and the Centre, in their efforts to promote increased utilization of renewable energy technologies, are collaborating with a variety of other international organizations, including the Latin American Energy Organization and ECLAC in the Caribbean region and the South Pacific Applied Geoscience Commission and the South Pacific Regional Energy Programme in the Pacific region. At the request of the GEF secretariat, UNEP is undertaking a preliminary study to develop a common framework for the provision of data on solar and wind energy resources using geographic information systems. Finally, UNEP has recently launched a sustainable energy advisory facility that provides rapid and responsive assistance to Governments on a range of sustainable energy topics.

18. A number of energy-related projects of the United Nations Industrial Development Organization (UNIDO) support a broad series of initiatives at the policy, institutional and enterprise levels to provide a solid foundation for the widespread introduction of solar energy. In order to stimulate investment in renewable energy technologies, UNIDO disseminates information on the application of solar, wind and sustainable biomass energy, and has established a specialized Centre for the Application of Solar Energy in Australia to provide an effective service to commercialize solar energy.

19. In pursuance of its central themes for the energy sector programme, the World Bank is financing a number of projects to enhance the renewable contribution to the energy supply. These include: (a) the alternate energy project in India to promote and commercialize investment in wind farms and solar photovoltaic power systems; (b) the renewable resource development project, also in India, that promotes the commercialization of irrigation-based small hydropower schemes, wind farms and solar photovoltaic systems by financing private sector investment; and (c) the Leyte-Luzon geothermal project in the Philippines that will assist in meeting the rapidly growing demand for electrical power.

20. Among its activities for promoting sustainable energy production, the World Meteorological Organization continues to focus on the development, provision and use of climate information in the development of renewable sources of energy, specifically data on solar and wind resources.

V. Implementation of the World Solar Programme 1996-2005

21. A number of countries have taken legislative and executive action to promote renewable sources of energy in line with the recommendations contained in the Harare Declaration on Solar Energy and Sustainable Development. Although not exhaustive, the following examples provide a perspective on the type and extent of activities under way throughout the world in support of the World Solar Programme 1996-2005:

(a) In August 1999, the Inter-ministerial Committee on Economic Planning of the Government of Italy approved a "White book on the utilization of energy from renewable resources". The report outlines

the objectives to be pursued for each renewable source in order, *inter alia*, to reduce carbon dioxide emissions. Overall, electricity from renewable sources is expected to increase by 6.5 million tons of oil equivalent between 2008 and 2012. The report also calls for the establishment of a permanent unit of the Ministry of Industry to coordinate government action in favour of renewable energy, and increased research in that field nationally, within the European Union, and with developing countries, especially in the Mediterranean area;

(b) In 1999, the Government of Australia announced funding of A$ 10 million (US$ 6.6 million) under the "renewable energy showcase grant" programme to assist in the development and dissemination of renewable energy. Successful projects are expected to demonstrate a strong commercial potential, long-term technical and commercial viability of large-scale renewable energy applications, and a reduction in greenhouse gas emissions. As a result of another initiative taken following the adoption of the Kyoto Protocol, the Government of Australia will require that an additional 2 per cent of all electrical energy sold originates from renewable sources by 2010. In a third initiative, the Australian Parliament recently approved the goods and service tax, which calls for the revenue from an excise tax on diesel fuel used for power production to be reinvested in renewable energy projects, with effect from 1 July 2000;

(c) As previously mentioned, in 1999, China launched one of the largest renewable energy technical assistance projects. Financed by GEF and the Governments of Australia, China and the Netherlands, and executed by the Department of Economic and Social Affairs, the project focuses on accelerating the strengthening of the commercialization capacity of renewable energy in China. Specifically, the project aims at establishing a mechanism to attract the domestic and international investment needed for the large-scale exploitation of renewable energy in China;

(d) In Egypt, the New and Renewable Energy Authority (NREA), established in 1986, has served as the focal point for developing and promoting renewable energy technologies in the country. Created as a specialized centre within NREA, with support from the Governments of Egypt and Italy and the European Commission, the Egyptian Renewable Energy Development Organization carries out studies, research, testing and certification activities for the development of renewable energy components and systems. It also performs tests on equipment performance, reliability and durability, and on environmental effects;

(e) In the United States of America, an executive order was signed by the President that seeks to triple the use of biomass for electricity generation, transportation fuels and chemical feedstocks in the United States by 2010. The executive order directs the Government to set up a permanent Inter-agency Council on Biobased Products and Bioenergy, at the cabinet level, co-chaired by the Secretaries of Energy and Agriculture and including the Administrator of the Environmental Protection Agency and the Director of the National Science Foundation. The Council is supported by an advisory body composed of biomass industry leaders, farm and forestry sector representatives, university researchers and environmental groups, which are to provide information and advice. In the field of solar energy, a millennium solar roofs programme is being implemented. The programme aims at the installation of 1 million solar water and photovoltaic systems by 2010. At present, the trend is to go from demonstration and tests to a market-centred project primarily with private sector funding. The programme works through the creation of partnerships between the Department of Energy, local communities and national agencies concerned;

(f) The Government of India has made major strides in the exploitation of various renewable energy technologies. A large number of decentralized and centralized renewable energy installations have been set up in India. A number of policy measures have been taken by the Government to promote the large-scale use of renewable energy sources. A renewable energy policy statement is being formulated. It will focus on policy interventions and the creation of a conducive enabling environment to accelerate diffusion of renewable energy in the country and set a goal for power generation from renewable sources within the overall energy scene;

(g) The Government of Ecuador has created, within the Ministry of Energy and Mines, a Directorate of Alternative Energies that is responsible for the promotion of new and renewable sources of energy and energy efficiency. At present, the Directorate implements renewable energy projects, with special

emphasis on isolated areas, as a means of providing energy to the many rural settlements that have no access to electricity. One of these projects, included in the World Solar Programme 1996-2005, is the electrification of the Galapagos Islands, which is financed by GEF and the Government of Ecuador and implemented by the national power utility;

(h) The Government of Cuba has been implementing an ambitious rural electrification programme in order to improve the living standards and productivity of rural populations. The programme aims at bringing electricity almost exclusively from the exploitation of mini-hydro, wind, solar photovoltaic and biomass energy to all mountainous areas where it has not been feasible to extend the grid. Within the framework of the programme, a computerized graphic information system has been developed, making it possible to rapidly obtain the information required on the state of advancement of the rural electrification programme and of the utilization of renewable energy sources;

(i) The Government of Benin, implementing a recommendation of the African Solar Forum organized by the World Solar Commission, established in March 1999, a national solar committee with a permanent secretariat. The committee is responsible for guiding and coordinating all activities related to the World Solar Programme 1996-2005 in the country;

(j) The Government of Japan has approved a new energy introduction outline, which includes targets for the large-scale introduction of renewable energy technologies, focusing on solar photovoltaic and wind energy. The objective is to install more than 1 million primarily residential grid-connected photovoltaic systems by 2010. During this same period, it is also planned that the production of wind-generated electricity will increase from 21 to 300 MW.

22. Under the aegis of the World Solar Commission, and as part of the World Solar Programme 1996-2005, the following meetings have been held since the previous report of the Secretary-General:

(a) World Renewable Energy Congress, Kuala Lampur, 8-11 June 1999;

(b) Conference and Exhibition on World Solar Cooking and Food Processing: Strategies and Financing, Varese, Italy, 3-6 October 1999;

(c) Pan-European Forum on Business and Investment for Renewable Energy, Sofia, 1-3 December 1999.

VI. Conclusion

23. The number and size of the activities discussed in the present report demonstrate that there is an increasing interest worldwide in the use of renewable sources of energy and that progress has been achieved at the international, regional and national levels in the implementation of solar energy projects and programmes, including those of the World Solar Programme 1996-2005. In preparing for the deliberations of the Commission on Sustainable Development on energy issues at its ninth session, in 2001, the Inter-Agency Task Force on Energy is facilitating the contribution of the work under the World Solar Programme 1996-2005 and other complementary programmes to the consideration of the theme of energy by the Commission at that session, and continues its efforts to ensure that the World Solar Programme 1996-2005 is fully integrated and brought into the mainstream of the efforts of the United Nations system to attain the objectives of sustainable development.

Notes

[1] The term "solar" is used herein in a generic sense and refers to all forms of renewable energy, including the solar thermal, solar photovoltaic, biomass, wind, mini-hydro, tidal, ocean and geothermal forms.

[2] *Report of the Global Conference on the Sustainable Development of Small Island Developing States, Bridgetown, Barbados, 25 April-6 May 1994* (United Nations publication, Sales No. E.94.I.18 and corrigenda), chap. I, resolution 1, annex II.

[3] United Nations Educational, Scientific and Cultural Organization, *Records of the General Conference, Thirtieth Session, Paris, 26 October-17 November 1999*, vol. 1: *Resolutions*.